CDM Smith Technical Review on
Revised Remedial Investigation Report, Dated April 2017
Rolling Knolls Landfill Superfund Site
Prepared by Geosyntec Consultants, Inc.

CDM Smith has reviewed the Revised Remedial Investigation (RI) Report dated April 2017, for the Rolling Knolls Landfill Superfund Site, prepared by Geosyntec Consultants, Inc. CDM Smith's general and specific comments are listed below.

General comments:

1. The RI report provided extensive information on the nature and extent of contamination at the site. However, CDM Smith suggests the report be revised to include the following:
    a. Delineate the specific source areas, including the industrial wastes disposal areas, e.g., the extent of contamination at POI-1, POI-17, POI-18, and TP-09.
    b. The landfill has wide spread contamination by VOCs, pesticides, carcinogenic PAHs (CPAHs), PCBs, and metals. However, the contamination is not evenly distributed. The RI should discuss hot spots and better delineate their extent in figures to support later evaluation in the feasibility study for potential treatment/remediation other than capping. For example,
        i. High concentrations of CPAHs (benzo(a)pyrene, benzo(b)fluoranthene, and Dibenz(ah)anthracene) are mainly located in three areas: landscaping area 1, area surrounding SS-36, and area surrounding SS-52.
        ii. High concentrations of PCBs (>10 ppm) and dioxins (>480 ng/kg) are limited to a few areas (note: it is also in the general vicinity with high CPAHs in one location). By remediating these areas, you will achieve significant risk reduction. (Note: TSCA requires treatment/removal of PCB concentrations above 10 ppm and capping of PCBs less than 10 ppm. Dioxins above 480 ng/kg represent cancer risks above 10^-4 risk.)
        iii. Lead contamination at the surface soil is wide spread with concentrations as high as 16,500 ppm. However, there are only a few locations with high lead concentrations (>4000 ppm, that is 10 times the residential SRS). These areas can be remediated together with PCBs and dioxins.
        iv. The attached figures show the hot spots.

2. The ultimate finding for most constituents/media seems to be that contamination has generally been delineated to ARARs or background, or another nearby source is contributing (i.e. the shooting range to the west). Background threshold values (BTV) have been determined for many constituents/media, but these do not seem to be utilized in the report. There are examples where BTV are exceeded in samples at the edge of the monitoring network, such as metals in surface water. Exceedances of BTV should be discussed, especially at the perimeter of the monitoring network. More direct discussion is needed of why exceedances along the perimeter require no further delineation (when that is the case; it is acknowledged that some additional delineation will or has been performed, beyond the data set included in this report).

3. Arsenic concentrations in filtered groundwater samples are often similar to unfiltered samples. This deserves more attention in the report. The general statement that filtered and unfiltered results are similar remains unchanged. The similar filtered/unfiltered results are discussed for iron and manganese but not arsenic.

4. There is no discussion of PCB congeners. Both SS-137 and SS-138, located on edge of landfill, have exceedances but are not discussed. Please add a discussion for these locations to the report.

Specific Comments:

1. **Page xvii: bottom** - Executive Summary: add dumpster area to baseball field and shooting range outside the landfill area. Mention hunt club building along with "hunting". That would be the first mention, with the next being the VI investigation there.
2. **Page xviii, end of the first paragraph**: Explain why northern ponds can't seasonally connect to wetlands.
3. **Page xxiii: Second paragraph (just above bullets)** This states that all elements of RI and RA are complete. This should be qualified to note that additional delineation is required at MW-10, MW-19 etc. per second bullet on page xx of the executive summary.
4. **Page xxiii Second bullet**: This states that subsurface soil not significantly impacted. It's easy to find subsurface exceedances, so why is the impact insignificant? It appears from Section 4.5.2 that this sentence is intended to refer to the native soil however, it is not stated in the bullet. This should be clarified.
5. **Section 2.2.4 Page 16, 4th paragraph**: List POI-14 to complete list of POIs where surface soils were collected. POI-14 surface sample is not covered anywhere until results section. The Reference to 2.2.2 for POI 17 and 18 does not discuss surface samples, and no surface samples for POI 17-18 are on table B-3. Please address these omissions.
6. **Section 2.3.1 Page 26 last paragraph:** This states that for SS-177 through SS-183 soil samples were collected 1 and 2 feet below the waste material. The QAPP called for samples 1 foot below waste material and 1 foot above top of clay. This is how the field work was conducted but in some cases the waste went down to the clay, so the deeper sample was in the clay (or silt) or immediately below the shallower sample. This should be noted in the text. At SS-178 no trash is shown on the log, and three samples were collected – please explain why. For SS-179 and SS-180 not all samples are indicated on the logs. At SS-180 log shows that the trash extended to the clay; the shallower sample was collected in the trash and the deeper sample was collected immediately below the trash in the clay. No lithologic log is available for SS-179. At SS-181 the lithologic log is incomplete and the sample positions cannot be judged. At SS-182 one can't judge the position of deeper sample due to incomplete log. Clarify sample depth issue and complete logs.
7. **Section 3.1 Page 34 second paragraph**. If the above comment on 2.2.4 is accurate it appears that the total number of surface soil sample locations is 13 not 15.
8. **Section 3.4.2.2 page 40 second paragraph:** This indicates the western pond is discharging (only); however, the top paragraph on page 42 and executive summary suggest the pond receiving recharge from groundwater to the east and discharging to the west. The latter idea seems to be correct; please make the text consistent. Also explain why there would or wouldn't be seasonal connection between ponds and wetlands here.
9. **Section 3.5.1.1:** This states that seasonal hydrologic connection between western pond and wooded wetland is via a culvert beneath the access road. Presumably the other ponds have no culvert and that is why there is no connection. The culvert should be cited in the other references to that hydrologic connection which appear earlier in the report.
10. **Section 4.2.1, Page 60**: Mephenesin as a TIC was tentatively identified at an estimated concentration of 78,000 mg/kg at TP-09. The RI report concluded that "the presence of this compound has not been confirmed" and "its possible presence in the landfill is not indicative of industrial waste." Given the compound was detected in such a high concentration, it should be part of the improved delineation as noted in general comment #1 above, and its presence should be confirmed during pre-design

investigation for any remedy that includes hot spot remediation. Please also see the next comment regarding PCB and pesticide contamination at the same location/sample.

11. **Section 4.2.1, Page 61, first paragraph**: Aroclor 1254 was detected at 310 mg/kg. Pesticides were also detected at high concentrations. The report indicates that "the substrate of sample TP-09 was predominately organic carbon, as indicated by the TOC concentration of 838,000 mg/kg (83.8 percent organic carbon)." This could be an indication that spent granular activated carbon (GAC) may have been disposed at this location. With such high concentrations of PCBs and pesticides, this area should be delineated in the report.
12. **Section 4.2.1, page 61, last paragraph:** The report states that "detection of higher levels of PCBs, BTEX, TCE, and cis-1,2 DCE in the material observed in TP-09, the PID readings, and the visual observations in the test pit, indicate industrial waste may have been present in the test pit." As recommended in the above two comments, this area should be delineated so that it can be evaluated in the FS for possible hot spot remediation.
13. **Section 4.3.1.1, page 64, second paragraph:** Please use consistent units when presenting dioxin (or any other contaminants) concentrations throughout the report. For example, the report states "Dioxin toxic equivalent (TEQ) concentrations ranging from 2.8 to 6.63 nanogram per kilogram (ng/kg), are less that or within the acceptable risk range for residential soil (4.8E-06 mg/kg – 4.8E-4 mg/kg) for cancer risk." Use of different units in the same sentence (or within the same report) makes the comparison difficult. This comment also applies to other sections in the report. Section 4.3.2.1, Page 66 second paragraph: acknowledges that PAH's at the ball field are elevated above background based on hypothesis testing, but goes on to say that the central tendencies are consistent with background (only upper tails of the distributions are above background). At SS-09 a few PAHs exceed the BTV, but this is not noted.
14. **Section 4.3.2.2, Page 66 last paragraph**: This states that statistics show "most PAHs and inorganic constituents, including vanadium, are consistent with background. Not noted is that vanadium and BaP slightly exceed BTV at the ballfield.
15. **Section 4.3.2.5, page 69, third paragraph**: The report states "Although PAHs are present at concentrations above the Residential and Non-Residential SRSs, their occurrence is widespread and does not suggest a point source or release." Similar statements were presented throughout the report for other contaminants. This may be or may not be true for the contaminants released. The RI should delineate the extent of contamination, in particular the hot spots (see general comment #1), for possible remediation.
16. **Section 4.3.2.5, page 70, third full paragraph:** The report states that "Exceedances of SRSs for lead and arsenic occur throughout the landfill in no distinct pattern." As recommended in general comment #1, the RI should delineate the extent of contamination, in particular the hot spots, for possible remediation.
17. **Section 4.3.3, page 71, third paragraph of the section**: The report states "Although PAHs were present at concentrations greater [than] Residential and Non-Residential SRSs, their occurrence is widespread and does not suggest a point source [of] release." As indicated in general comment #1, high concentrations of CPAHs are mainly located in three areas and should be considered for potential remediation.
18. **Section 4.3.3 page 72 fourth paragraph**: This states that in subsurface soil only few inorganic constituents (Al, Be, V) were consistent with background, based on hypothesis testing. Lead, cadmium and selenium (and PAH slightly) exceed BTV, which is not noted. Lead exceedances of SRS was discussed in previous paragraph, but cadmium and selenium were not discussed at all (SS-103).
19. **Section 4.3.3, page 72, second paragraph:** The report states "Total PCBs, calculated as the sum of Aroclors, ranged in concentration from less than 1 to 24.8 mg/kg." However, PCBs were detected as high as 310 mg/kg in TP-09. See comment #3 above.

20. **Section 4.5.1.1**: Please see general comment #1 regarding distribution of CPAHs.
21. **Section 4.5.1.3:** There are several areas that have high PCB concentrations (>10 ppm), in particular in the area surrounding SS-52. This area also has high concentrations of CPAHs and lead. There are several locations to the west, south and east of the site where PCB is not delineated to RDC. The revised report should include delineation of this contamination. Also see general comment #1.
22. **Section 4.5.1.5:** There are several lead contamination hot spots, e.g., SS-55 with 16,500 ppm, SS-103 with 13,800 ppm, and several other locations, that need to be discussed.
23. **Section 4.5.3 page 77, third paragraph**: Dioxin/furan exceedances at the edge of the landfill seem understated. SS-139 has result of 12.8 ng/kg (not necessarily "similar" to the RSL value 4.8ng/kg).
24. **Section 4.5.3, page 79, first paragraph**: There are several hot spots of dioxin contamination. For examples, SS-72 with 932 ng/kg, SS-104 with 742 ng/kg, and SS-66 with 545 ng/kg. These should be discussed in the report.
25. **Section 4.6.1.2 page 84 fourth paragraph**: Arsenic concentrations were often similar in filtered and unfiltered samples; this is an exception to the generalization that usually filtered and unfiltered are similar, and this should be stated in the report.
26. **Section 4.6.1.2, page 84, last sentence**: Note that aluminum, iron, and manganese are not trace elements. Please correct sentence.
27. **Section 4.6.3, page 86, third bullet at bottom of page:** It is unclear how the VOC contamination in groundwater can be delineated via pore water samples from MW-18 and MW-19. Are these new wells or existing wells? Please clarify in the text.
28. **Section 4.6.3, page 86, fourth bullet:** Please specify which contaminants will be evaluated for biological degradation. Benzene can be readily degraded under aerobic conditions. However, 1,4-dioxane and PCBs are recalcitrant to biodegradation.
29. **Section 4.8.2 page 94 paragraph 5**: This says SW-34 is on northeastern portion of site; this should be corrected to say the northwestern portion of the site.
30. **Section 4.9.3, page 104, the last sentences of second and third paragraphs:** It is unclear how these two sentences support the general idea of this section, other than do argument. It only show that the extent of site influence on surface water has been delineated. This section should be rewritten to clarify that aspect of the downstream results.
31. **Section 6.2.2.1:** This section should also discuss hot spots within the landfill.
32. **Section 6.2.2.2:** The report states "There are also potential sources upgradient of the landfill, particularly for inorganic constituents." This statement was not substantiated nor discussed in Section 4.
33. **Section 6.2.2.3, page 128, next to last paragraph of section:** This paragraph discussed degradation of contaminants and stated that benzene concentrations at well MW-3 have decreased from approximately 300 ug/L in 2007 and 2008 to approximately 140 ug/L in 2014 and 2015. Please note that the decrease in benzene concentrations can be a result of degradation as well as from migration and dilution. Biodegradation of benzene at this site has not been observed and validated.
34. **Section 6.4, page 138, 2nd and 3rd bullets**: – Please provide an explanation how compound-specific isotope analysis can be used to characterize potential biodegradation processes for 1,4-dioxane. Also explain how the synthetic precipitation procedure, sequential extraction procedure, and other methods can be used to evaluate the potential for metals in groundwater to adsorb to or precipitate onto the aquifer material.

Figures

Figure 1-3 Fix pink landfill shading – it does not reach edge of landfill on southeast side.
Figures 2-4 and 4-1: SS-181 Location is different on Figure 2-4 than on Figure 4-1.

Figures 4-1a-d soil results – This is improved now with exceedances shaded. However, it is noted that the shadings should also be shown and defined in the legend.
Figure C-1c is missing SS-153, which delineates from SS-152.

Tables

Table B-4A: there is still confusion on denoting groundwater exceedances, e.g. TWP-3, TWP-4. TWP-5 for benzo(k)fluoranthene. Please review the table, the different results and exceedances, and ensure that all parameters that exceed the noted PQL or GWQS are highlighted appropriately.

Boring Logs

The following discrepancies were noted and should be corrected in the revised report:

- For SS-177 through SS-183 the drilling company was SGS not ARCADIS.
- Log for SS-182 lists the SS-183 samples and does not show all stratigraphy observed.
- No strata log was provided for SS-179 and SS-181; strata log for SS-182 is incomplete.

Specific Comments to the previous Draft RI Report Not Addressed. The Section/page numbering refers to the November 2016 document and the number of the comment in CDM Smith's original comments letter on the document; only the comments not addressed or impartially addressed are repeated below.

1. **Executive Summary Page xvi, last sentence in first paragraph**: Please explain why there is only a hydraulic connection between the large pond and groundwater.
2. **Executive Summary, Page xvii, first paragraph below bullets:** This states that the selected ARARs may change during remedy selection process. This should be discussed further.
3. **Executive Summary, Page xxi, second paragraph** This states all the elements of the RI and risk assessments are complete, but previously it was stated that some contamination is still being investigated (delineated). That is inconsistent; the statement that RI is complete should be deleted or revised. It should also be stated (where appropriate) that ongoing evaluation will be presented in the final RI report.
4. **Section 1.2.1, page 2, first paragraph** – This should mention several smaller ponds are present on the landfill, in addition to the larger ones cited.
7. **Section 1.2.4 Previous Investigations, page 3 -** Please be specific with respect to the parameter lists discussed in this section (i.e. Priority Pollutant, Target Compound List, RCRA). Although there is overlap, list each as each includes a different set of parameters.
8. **Section 1.2.4, page 3, first paragraph** – Why does the RI exclude FIT data? In general there are other data collection events discussed in this section that are not included in the RI.
9. **Section 2.2, page 7, last paragraph** - Ten of the POIs had drums or drum remnants, not just three. Add a statement why test pits/sampling were not conducted at all drum areas.
10. **Section 2.2.2, page 12, third paragraph** – Explain why a 1-ft deep test pit was enough to delineate edge of landfilled materials.
11. **Section 2.2.2, pages 12-13, POI-1 Drum Investigation** - State why no soil samples were collected during POI-1 investigation.
12. **Section 2.2.2, page 14, third paragraph; POI-17 and POI-18 drum investigation** – Where are results of post-ex sample from POI-17/18?
13. **Section 2.2.4, page 16, first paragraph below bullets** - Explain why sampling frequency was less in the regulated areas. Explain why no subsurface samples were collected in the regulated area.

14. **Section 2.2.4, page 16, second paragraph below bullets** – Please review and clarify why no discussion of surface samples at POI-14, which had car battery casings? According to Figure 2-4 there was a sample collected here.
15. **Section 2.2.4, page 16, third paragraph below bullets** – This is the first mention of Weston. The results of samples collected by Weston do not appear to be included in RI. Was Weston the Site Assessment Team mentioned earlier? What was special about TP-09 that the soil samples were collected there? There was potential industrial waste observed there, but that was also true at TP-20-1 and TP-34.
16. **Section 2.2.5, page 18, last paragraph** – Add greater detail about how wells were developed.
17. **Section 2.2.5, page 19, third paragraph** – The sentence about purge rates is confusing, please revise and clarify this discussion.
18. **Section 2.3.1 Soil Sampling, Page 25 -** The first paragraph indicates that soil sampling was performed to delineate constituents present at concentrations above the SRS. Please add a discussion that the SRS are based on direct contact/inhalation pathways. Were impact to groundwater SRS generated and considered in developing the screening criteria for evaluating environmental contamination in the RIR?
23. **Section 2.3.2, page 27, third paragraph** – This paragraph states that "composite" sample was collected; homogenized would be a more accurate term. Please revise the text accordingly.
24. **Section 2.3.5, page 29, first paragraph** - Note that pore water samples were collected in place of MW-13 which could not be installed. Also, the porewater samples were inside the site boundary; proposed well was to be outside the site boundary. Please clarify this in the text.Note: *The second part of this comment (pore water sample collected inside landfill boundary) was not addressed.*
25. **Section 2.3.6, page 30, paragraph 4** - Specify parameters for filtered samples
28. **Section 3.1, page 32, Paragraph 3** - Several perimeter test pits had trash, several only went 1 ft. TP-10 was perimeter and clean, but only went 1 ft. Some edge areas lack a test pit. This may not be sufficient to delineate edges for the purposes of the feasibility study or later design efforts. Please revise the text to provide this consideration.
31. **Section 3.1, page 33** - Reference to Section 2.2.1.3 is incorrect. Seems to refer to 2.2.2, but this section does not include discussions of TP-10, as suggested here.
33. **Section 3.3 Geology, Page 37, Fourth paragraph** - Recommend that the discussion of the glacial sediments above the glacial lake clay unit be discussed in more detail as this is the key water-bearing unit that affects the migration of groundwater impacted by the Site. In particular, the characteristics of the sand units (e.g. thickness, aerial extent, continuity of beds) are important to a discussion of the transport of contaminants and development of the conceptual site model.
34. **Section 3.4.2.1 Hydrostratigraphic Units, Page 39, First full paragraph -** As with the discussion of local geology, the discussion of local hydrostratigraphic units should discuss details of the water-bearing units (silt, sand and clay). What is the saturated thickness, how do they relate to hydraulic conductivity estimates in support of future flux calculations. It is also recommended that the cross sections be extended to include the streams that are concluded to be local discharge points, and that consistent scales be used for all of the cross sections so that they are more easily compared.
36. **Section 3.4.2.3 Hydraulic Properties, Page 42, First paragraph** - Please present the equation (if hydraulic conductivity was calculated) or the graphs used (if graphical method was used) along with a discussion of how the method was used: the assumptions (e.g. saturated/aquifer thickness), conversion factors (e.g. gpd/ft to ft2/day) and limitations of the method used. Table 1 from Attachment G appears to be an important summary of many of these factors. Perhaps it would help to make the table part of the RIR tables included in the body of the report as it would help the reader understand which wells were used and what the range in conductivity is for each well.
37. **Section 3.4.2.3 Hydraulic Properties, Page 42, Second paragraph, first sentence** - The "Darcy groundwater velocity" is not the same as average linear velocity. It is actually a flux that does not include porosity in its calculation. Recommend changing the term used in this sentence.
38. **Section 3.4.2.4 Hunt Club Well HC-1, Page 43, First complete paragraph** - Based on the range in clay thickness from literature and the observed well depth, would Geosyntec conclude that the well is

completed in fractured rock? Water supply wells completed in rock typically have open hole construction, which is consistent with the video survey.

39. **Section 3.4.2.4, page 43, second paragraph** – HC-1 appears to be a bedrock open hole well based upon the video inspection. Please confirm and revise the text accordingly.
40. **Section 4.1.1, page 57, first paragraph**– Dozens of old telephone hand sets are present in one area of the landfill, possible industrial waste (west of MW-7 or MW-6).
41. **Section 4.2.1, pages 59-61** - The discussion of whether wastes at test pit locations TP-09, TP-20-1 and TP-34 is inconsistent. Samples were collected due to possible industrial waste. For TP-9 the discussion focuses heavily on mephenesin, detected as a TIC, and that it was used in a wide variety of commercial products so that its presence is not indicative of industrial waste. At the end of this section (and on page 57, 41.1.), TP-09 is considered possible industrial waste, due to high levels of PCB, BTEX, TCE and DCE, and visual observations. Please review to make the sections more consistent and specify which field observations suggest industrial waste (i.e. sheen for example).
42. **Section 4.1.2, page 58, second paragraph** – what is the evidence/documentation of skeet shooting over the ponds as opposed to the shooting range? *Note: Addressed in cover letter, but not in report.*
43. **Section 4.2.1, page 60, second paragraph** – Discuss how the TIC mephenesin was delineated. In general, report leaves discussions of TICs unresolved. Their presence is stated with no follow up conclusion.
44. **Section 4.2.2, page 62** - Discuss why no soil samples were collected near POI-1. Post excavation soil samples were collected at POI-17 and POI-18; where are the results provided?
45. **Section 4.3, page 63, second paragraph** - State why was it necessary to reanalyze metals in soil.
47. **Section 4.3.1.1, page 64 second paragraph** – PCB congeners, dioxin, furans were not included in Appendix J for reference areas. Please review and revise the text accordingly.
48. **Section 4.3.2.2 Shooting Range, Page 66** - This section discusses the results of soil sampling at an onsite shooting range north of the landfill. Samples from this area were not elevated in lead. Later it is speculated that an offsite shooting range could have contributed lead to offsite soils west of the landfill. The report should be clear as to which shooting range is being discussed and why it is concluded that one may have contributed lead to soil when another does not appear to have.
51. **Section 4.3.2.3, page 68, paragraph 2** - TEQ for dioxin does not match that listed in Attachment J.
52. **Section 4.3.2.5 Landfill, page 69** - This section discusses the presence and frequency of contaminants detected in surface soil samples at the Landfill, but does not discuss distribution. Were the contaminants randomly distributed or concentrated in certain areas of the Landfill? Please discuss the distribution in all sections presenting the results of soil sampling and analysis. References to figure(s) are not sufficient to express the conclusions of the investigators.
54. **Section 4.3.3, page 73** – Please consider whether a statement can be made on likelihood of point source for inorganics and PCBs, similar to what was said about other contaminants, and revise the text accordingly.
56. **Section 4.5, page 76, summary table of exceedances** – There are other exceedances; it is recommended to add a comprehensive table.
59. **Section 4.5.3,, page 79, last line of section** - SS-183 value is 6.766, more than marginally above the cancer RSL of 4.8 ng/kg. Please revise text to remove the statement "only marginally".
63. **Section 4.6.1.1, page 80** - The last paragraph cites published data for metals in groundwater to state that metals in groundwater at the Site warrant no further inquiry because site concentrations are similar to background. Text specifically cites aluminum, arsenic, iron and manganese but no published reference is provided for aluminum. Maximum iron and manganese concentrations at the site (Appendix I) are much higher than the cited background ranges. These factors as presented do not seem to support that no further inquiry into metals in groundwater is necessary.
64. **Section 4.6.1.1, page 81, paragraphs 2-5** – These paragraphs discuss TICs in groundwater; no discussion of estimated concentrations, whether they exceeded generic groundwater criteria (carcinogenic/noncarcinogenic) or why further study is or isn't warranted. This discussion should be added to the report.

66. **Section 4.6.1.2, page 82, 4th paragraph** - This states that benzene concentrations at MW-10 and MW-19 are marginally above the standard. Standard is 1 ppb. Concentrations are 2 to 3.2 ppb – state the concentrations and remove the qualifying word "marginal".
67. **Section 4.6.2.2, page 83, third, fourth, fifth, sixth, seventh bullets** - Table 4B-A does not highlight these SVOC exceedances; for TWP-6 benz(a)pyrene equals, does not exceed standard. As noted above there are still issues with denoting exceedances.
68. **Section 4.6.1.2, page 84, top paragraph** – In some cases filtered metals concentrations are similar to unfiltered concentrations. Arsenic, iron, manganese and sodium in MW-3 for example. Not all cases of metals exceedances seems to be related to colloids – especially iron and manganese. List of metals exceedances leaves out some that exceed in temporary well points, e.g. chromium, cobalt, copper (and cyanide). The idea that metals concentrations are due to colloids is not necessarily supported, this paragraph should be revised accordingly.
69. **Section 4.6.1.2, page 84, second paragraph** – States that X-3 data, in the wetlands, indicates that iron in groundwater is less soluble in the wetlands, as the report discusses. It is the only location where a well is that far into the wetlands. Rather than "indicates", state that this "suggests" since this idea cannot be tested elsewhere.
70. **Section 4.6.1.2, page 84, third paragraph** - This discusses regionally high concentrations of metals due to rock type – see specific comment 63 above.
71. **Section 4.6.1.2, page 84, paragraph 4** - This discusses TICs in groundwater, stating that their presence is not confirmed because they were detected in only one of two sampling events in 2015 and concentrations were low. However they were detected in the previous phase. In addition, TIC concentrations are estimated, results from a calibrated analysis could be very different than TIC concentrations. TICs should be evaluated further to see if they warrant calibrated analysis. This also applies to TIC mephenesin, found GW-TWP-8, and in a waste sample from TP-09.
72. **Section 4.6.3, page 85, bullet list** – Benzene exceedance at MW-10 is not discussed. PCB exceedance at TWP-4 not discussed. SVOC and pesticide exceedances not discussed. Please revise to include all exceedances.
73. **Section 4.6.3, page 86, First paragraph** – As noted above, dismissal of metals in groundwater as being due to ambient conditions and/or colloids is not well supported and should be reviewed and revised.
75. **Section 4.8 Surface Water, page 87** - There are a number of instances where the semi-quantitative analysis indicated that specific contaminants were elevated compared to background, but the results were not discussed in the text. The text should be revised to explain why these results were not included, for instance, is it because the concentrations of these contaminants were below ARAR's?
78. **Section 4.8.1.2, page 92, first paragraph** – Based on upstream data, the concentrations of barium, cadmium, copper nickel and zinc found downstream in Black Brook may indicate landfill impact; however, report suggests otherwise for these contaminants based on their statistical analysis (see review statistical analysis).
81. **Section 4.8.1.3, page 92, last paragraph** – This states that dissolved Mn appears elevated relative to upstream conditions. Based on Appendix I, total and dissolved Mn appear similar to each other, and to upstream conditions.
82. **Section 4.8.2, page 94, top paragraph** – SW-SW-44 (not SW-44) is located near the northwestern edge of the landfill (not the northeastern, as stated).This comment applies to SW-SW-34 which is incorrectly described as being on the northeastern side of the site.
83. **Section 4.8.3, page 94, last paragraph** – This paragraph omits VOC exceedances in ponds. Please revise.
84. **Section 4.8.3, page 95, top paragraph** - As stated above in comment 82, manganese concentrations in ponds may not suggest landfill impact based on Appendix I.
86. **Section 4.9.1.2.2, page 99, fourth paragraph** – States that PCB detection limit in upstream Black Brook samples was higher than PCB detections in downstream Black Brook samples. Therefore concentrations in upstream Black Brook may be higher than the down stream J values. To properly address this hypothesis, the report should present the upstream MDLs. This seems to use ND values

upgradient to suggest that upstream concentrations exceed downstream concentrations. Faulty. Truth is that due to high detection limits upstream samples have little value.

87. **Section 4.9.1.3, page 101, last paragraph** – What is the evidence/documentation of skeet shooting over the ponds as opposed to the shooting range?
88. **Section 4.9.2, page 103, top of page** – This states that POI-14 was car battery casings. The fact that lead at SS-169 and SS-170 was at lower concentration than at SS-144 does not preclude that this area was impacted by the landfill. More data would be necessary to rule out the landfill as a source of lead at SS-169, SS-170, SS-171, and/or confirm off-site shooting range as source.
89. **Section 6.1 Summary of Hydrogeologic Conditions, page 122** - This section should specifically discuss the discharge point for the shallow water-bearing unit. It is only discussed in general terms in the third paragraph. The section also devotes a full paragraph to discussing the underlying clay aquitard but relatively little discussion of the shallow water bearing unit is provided. The conceptual model should expand the discussion of this unit because it is the primary pathway for contaminant migration in groundwater. The wide range of hydraulic conductivity estimates should be discussed in terms of formation material and continuity of more conductive sand beds. The discussion of saturated waste material should also indicate if the difference in depth to groundwater is a function of ground surface elevation or other waste characteristics and whether mounding of groundwater, typical of landfill, has resulted in a radial groundwater flow pattern. This is a key factor when evaluating the impact of "upgradient" contamination on the Site, as discussed in section 6.2.2.2.
90. **Section 6.2.1 Constituent Sources, page 123** - This section indicates that there are limited point sources in the landfill but that they are a minor component of the total waste volume. The section should also discuss if these points sources, although small in volume, may be a major source of environmental contamination, particularly to groundwater, compared the larger volumes of standard municipal waste.
91. **Section 6.2.2.2 Groundwater in the Shallow Water-Bearing Zone, page 124** - The "potential sources upgradient" should be specifically discussed.
92. **Section 6.2.2.3 Fate and Transport of Constituents, page 128** - The text indicates that geochemical conditions can be either aerobic or anaerobic and what the fate of constituents like benzene could be. At this point the conceptual model should indicate what the conclusions are from the data collected to date. DO and ORP measurements from groundwater samples should give an idea of these conditions and a more definite statement should be made concerning the benzene concentrations at MW-3. This should also be the case in the last paragraph on page 129 where redox controlled metals area discussed. *Additional note: The end Section 6 indicates that additional data are being collected to further evaluate aquifer geochemistry. This should be referenced earlier; the reader is waiting to find out which condition actually applies to the site, and at the end finds out its still being determined.*
93. **Section 6.3 Overview of the Landfill, Constituent Transport Processes, and Constituent Distribution, page 131** - As discussed on specific comment 90, although industrial waste volumes may be small compared to the overall municipal waste volume, the conceptual model should indicate if they are the major source of environmental contamination, particularly to groundwater.
94. **Section 6.4 Identification of Data Gaps and Uncertainty, page 133** - Additional justification should be provided for the offsite shooting range as a potential source of lead when the shooting range to the north of the landfill does not appear to be.
95. **Section 7.0 Summary and Conclusions, Fifth Bullet, page 134** - More detail should be provided with regard to the Site impact on the "soil beneath" the landfill. It is not clear what type of soil this refers to. Where there is groundwater contamination, the fate and transport section indicates that contaminants should be adsorbing to soil.